THE JOURNAL OF GEOGRAPHY

VOL. VIII FEBRUARY, 1910 No. 6

THE CHANGE OF RESPONSE DUE TO A CHANGING MARKET*

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IT is hardly safe to assume that cities and towns owe their existence to physiographic factors alone, for an analysis of these factors cannot explain, except by some process of mental juggling, the location and size of all our cities and towns. I am not going to cast aside the physiographic factor but I am going to advance the statement that the fitness of any site is determined in the long run by the condition, as well as the accessibility of the market.

I can conceive of towns, in the early days of the nation's history, with a situation on the coast at a time when altruistic motives did not prevail on the high seas, becoming flourishing ports. There was a time when Portsmouth, New Hampshire, amassed considerable wealth through the privateering fleet which sailed from its waters; and while it might be said that in the most revenue producing business of the times, the town responded to its environment and accepted the opportunities legitimatized more by lack of control than positive assertions, it is also to be noted that the increase in wealth and size directed attention to the business and resulted shortly in an awakened public conscience which soon cut off the source of gain. If ill-gotten gains were accounted as productive revenues, I could not maintain my proposition. Again, in pioneer days, outposts were established to protect the larger settlements from the Indians or to serve as hostelries, and while many of these were the beginnings of towns, in their inception they must be considered as in reality portions of the seat of government and not in essence separate towns until they became self-supporting.

* Paper read before the Association of American Geographers, January, 1910.

There are many towns established under a certain necessity and in the face of definite conditions of market which have been forced to face a newer régime than that at their founding—to these towns there is left one of three courses, the path of decadency, a struggle barely to maintain itself or a larger usefulness by adapting its resources to the newer conditions. But all of these are not of necessity open. Whichever of these ways is followed within the limits of commercial demands, the decision is based in part on the habitant and in part on the physiographic aspect. The physiographic environment must however be of such a character that a conveyance of its resources to some market, be it local or more extensive, is easy enough to meet competition. In the last analysis then it is not the physiographic environment which determines the situation and growth of a town but the market places which allow men to make use of favorable conditions of physiography and even encourage men to contend against unfavorable physiographic surroundings. All good physiographic sites, *per se*, are not the sites of towns, nor are all towns on the best purely physiographic sites. Furthermore the market is not a stable one. It fluctuates with the demands made upon mankind in the steps of civilization, in the evolution of all the functions of the complex life of manufacture, trade and government and in the dictates of fashion.

In the founding of Sutton and Worcester, both in the State of Massachusetts, but one item attracted the pioneer to these inland sites, namely, meadow land. To be sure back of this are the larger conditions of routes from Boston, the focus of organized government at that time, of outposts for protection from the Indian invasion and of lines of traffic from Boston westward. But these were self-sustained towns and the stern necessity of pioneer life demanded meadow land for their sustenance and in the course of years Worcester and Sutton were established directly in response to this feature of physiography and they grew in population to the extent permitted by these limited areas. Their markets were however circumscribed. They increased to the limit of productivity of the soil and nothing was left but to barter with their neighbors for the goods which the distant places might produce. When local industries began to be introduced, both developed somewhat and by stage and highway com-

munication commercial relations were begun. Sutton during all this time had a slight advantage over Worcester in more extensive meadow lands and as late as 1820 excelled Worcester both in population and in output of shops.

As the industrial spirit grew throughout the country at large and the nation began to face seriously the problems of manufacture and commerce, the problems of transportation were agitated. It was then that the Providence and Worcester Canal was conceived which gave the latter city communication with tide water and opened new opportunities for the inland town. Sutton, which for over a hundred years stood above Worcester in population tables, is situated like Worcester in the uplands of Massachusetts. Ponds and swamps and brooks, the headwaters of larger streams which yield small tracts of rich meadow land between the hills, are the attractive features. As long as horse and stage were the means of travel her situation was as promising as Worcester. Worcester had all these things in nearly the same degree but in addition it had a situation of peculiar merit for an upland location which were the results of a series of modifications of the original topography.

In the Statistical Atlas of the United States Census for 1900, Worcester is rated the twenty-ninth city in respect to size in the United States. All of the cities which stand ahead of Worcester with the exception of Denver, Colorado, are situated on some waterway. A waterway, large river or safe harbor, is a physiographic factor to which mankind frequently responds because of an easy highway to market; but these factors alone are not sufficient because specific points along waterways and not all good harbors are the sites of flourishing cities. But, other conditions being equal, a waterway or water front seems to be favored and desired. In a general lack of waterways, it is conceivable that overland routes of travel may converge towards a pass or valley and a distributing depot be built up which commands these avenues of traffic. Semple* writes that "Denver's geographical location at the foot of the Rocky Mountains, near three of the natural passways to the Far West followed by the Union Pacific, the Denver and Rio Grande, and the Santa Fé Railroads, made it

*American History and its Geographic Conditions, 361.

a distributing-point for a large hinterland." Indianapolis, Indiana, the twenty-first city, and Columbus, Ohio, the twenty-eighth, are on small rivers but they are situated in regions of comparatively level lands and as geographical centers of great states they have become, easily, the political centers. Worcester, the twenty-ninth city, is like Denver at the headwaters of streams which as pathways of travel are negligible. Furthermore, it is situated in the midst of an upland country with no mountain passes leading to it to give it prominence and it has no political boon save being the shire town of half a county to give it prominence or to invite citizenship therein.

This upland site has been opened to the markets of the world by natural and modified drainage features which have had an important bearing on the development of Worcester into an extensive manufacturing center. These features are briefly summarized.

1. From the north, through the west to the south, many short streams converge towards Worcester. All the waters of these streams pass through the water gap in the southeastern part of Worcester and form the present Blackstone River.

2. An easy passageway is opened into the valley of the Quinsigamond River on the east, and the French River on the west by the process of drainage modification. In the former case it is through the Blackstone water gap; in the latter by the abandoned valley of the ancient Auburn River.

3. Beyond the limits of the above mentioned streams, rivers of considerable size radiate from the Worcester region as a center: in the northwest are the branches of the Ware River, a tributary of the Quaboag; in the west, the Ware and Quaboag Rivers, tributaries of the Chicopee; in the south, the French River, a tributary of the Quinebaug; in the southeast, the Blackstone River; and in the east, the Assabet and Sudbury Rivers whose confluent streams form the Concord River.

4. With the exception of the easterly flowing Nashua and the westerly flowing Ware and Orange Rivers which make a pass or two in northern Massachusetts, the natural road of travel, which is by river valleys, lies along the diverging and converging streams which radiate from Worcester.

5. The modifications of drainage forming the water gap of

the Blackstone River; the abandoned valley of the Auburn River; the Stillwater-Quinsigamond separation; the slighter features of capture shown in Kettle, Mill and Tatnuck Brooks; and the spillways along Chaffin's Pond and the Summit Station routes have rendered these pathways much more efficient as highways.

A manufacturing city cannot develop apart from a market for its wares. Not only must there be a market but there must be convenient and inexpensive means of supplying the market. In 1837, the total amount of capital invested in manufacturing in Worcester was only one-fourteenth of the amount invested in one concern in 1895. To the end of the Civil War, Worcester's leading staples were woolen goods, boots and shoes, and machinery, stated approximately in the order of the amount of money invested in the manufacture of these articles. In 1865, metals and metallic goods are found at the top of the list and they have continued to be the leading manufactured articles of Worcester since that date; while the output of machinery has for twenty-five years exceeded the output of boots and shoes and woolen goods.

Until 1860, the market for Worcester's products was somewhat circumscribed. During all the years previous to the incorporation and the building of railroads, the shipment of goods must have been carried on with considerable difficulty and expense, and the local market determined the supply. After the Civil War, the world began to be the market and "without facilities for shipping her products at small cost to distant points, Worcester's manufacturing could never have grown beyond the needs of the rural population."* To illustrate how largely the later industrial development of the city was dependent not on the demands of the vicinity but on the more extended patronage, a brief summary of the history of two industries is introduced.

In 1845, the output of wire was excelled in value by three other staples. The demand was greatly increased in 1847 and the subsequent years by the construction of telegraph lines. In 1850, piano wires were added to the list. During the decade,

NOTE—By reference to the four topographic sheets (Worcester, Blackstone, Marlboro and Webster) which cover the region mentioned in this brief synopsis, one may obtain a clear idea of the drainage features.

* F. P. Rice. The Worcester of 1898, 1899.

1860 to 1870, the use of flat wire for hoop skirts made a short-lived but vigorous call upon the industries. In 1865, metals and metallic goods exceeded all other industries in Worcester in the number of men employed, amount of capital invested and the value of the goods made. Later the enormous demand for barbed wire and the growing use of electricity with the need of insulated wires and cable conductors increased the opportunity of these mills. The amount of capital invested in metals and metallic goods multiplied six times in the thirty years following the Civil War and in 1895 it was six and one-half millions of dollars.

Next in order, with an invested capital of four and one-half millions, in 1895 is the manufacture of machines. Of these the looms are the widest known. The increasing demand for textile fabrics and the extension of the textile industry was a factor in the growth of the loom works. It is reported, and it is easy to believe the truth of the statement, that there is scarcely a weaving plant in the United States which does not use looms of some one of the types constructed in Worcester.

Thus the market for the output of the many factories is a distant one. It is not by chance that a large manufacturing city exists in the midst of the uplands of New England. Open to all the surrounding area by river-made highways, she first sent her many manufactured articles to the older settlements on the hill tops or to the newer ones at some favorable situation along a power-yielding stream. Then, when the great traffic lines were opened, the city was connected with easy grades to the large ports of the North Atlantic Coast of the United States and to the extensive central area of the country.

The growth of a city or town may be a simple case of response to a great degree independent of the world at large or it may be a complicated story based first on its own situation and fostered by the various shifts in the development of affairs. It is simple when some "mushroom" town rises in the wilderness following the announcement of a strike of gold, and, then, perhaps sinks into decay when a yield is no longer possible. It must be admitted even here that it was not gold but the price of gold, not the physiographic fact of distribution alone, but that fact supported by the marketable product which caused the settlement. It is simple, again, when primitive people or pioneers living under

the law of the undeveloped facilities of communion and intercourse derive their livelihood only by a struggle with natural forces and conditions under the stress of a circumscribed market. It becomes complicated when a city connected with the growing world by all the devices of transportation and communication must enter into competition with other cities and must adapt itself to new processes arising out of new methods and inventions and to the vagaries of the changing desires of mankind.

Worcester and Sutton, although not purely representatives of these two classes may yet stand as two types of response. They were founded under similar circumstances and the early growth of the two towns was based upon the resources of field and meadow. To-day Sutton is responding to practically the same thing; Worcester has put her fields and meadows to other uses. The one has not changed the response; the other responds to different physiographic factors than was the case in the first one hundred years of its history. In the pioneer stage Sutton could easily keep pace in terms of population with Worcester for its meadow lands were more extensive and even though in the course of events New England's population turned largely to manufacturing, Sutton remains essentially an agricultural community, mostly because it has no physiographic advantage by which it could increase its market space.

In a complexity of industries in any city the change which is recorded in the Wire Company's output due to a changing market, may go on with no perceptible effect on a city's total business. Certain factories suspend operation; others are organized. The whole movement is in compliance with the demands of trade and is undertaken in the specific place in response to certain advantages of physiography, directly or indirectly. These silent changes in a city's life go on day by day; it is only in a few instances that a complete change of response is recorded. The History of New Bedford is interesting in this respect. New Bedford may be taken as another example of the change of response which was brought about directly by the failure of its earlier market. Settled, in the main, because of its natural harbor, by men interested in whaling, it grew to a city of 29,000 in 1860. But already there were signs of a losing game. The discovery of the oil wells in Pennsylvania and the working of them caused

a drop in the price of sperm and whale oil. In 1855, sperm oil sold at $1.77; in 1858 it had dropped to $1.21. So whale oil dropped from 79 cents in 1855 to 54 cents in 1858. The year 1857 marked the banner year in the New Bedford whaling industry. 319 vessels were in her fleet. 65 vessels sailed in 1858 fitted with $1,950,000 worth of produce. But her market for oil was fast disappearing under competition and the oil brought back from the north became a drug on the market. Between 1865 and 1870 the population decreased perceptibly in numbers. It was at this time that her people turned to other things and they early saw the advantage which the climate and situation offered for the development of cotton manufacturing and at once embraced this opportunity. So that when in 1871 the great disaster fell on New Bedford's whaling fleet in Bering Strait and 34 vessels were swept away in a storm there was no inducement to restore her fleet and she turned her face towards the manufacture of cotton cloth. The population increased rapidly from this time until in 1900 it reached 63,000.

My contention is this, that we have spoken about responses to physiography in too absolute terms. Such a revolution in the industrial life of a city as is instanced in the case of New Bedford had for its impetus the condition of the market and I imagine that the market areas open to a city's highways have not been given due consideration.

COFFEE IN BRAZIL.—There are nearly 654,000,000 coffee trees in the State of Sao Paulo, Brazil, the estimated yield of which in 1909-10 is 11,238,029 bags of coffee. This amount, plus 861,250 bags which it is calculated will be exported through Santos from the south of Minas and Paraná, represents practically the export quota of the Republic.

—From *Bulletin of American Republics*, October, 1909.

THE MODERN TREND OF GEOGRAPHY

By Bertha Henderson

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THAT at the present time the stress of all geography teaching in the High School is on the physical side and not on the humanistic side is painfully evident to any teacher of geography who handles classes made up of graduates from High Schools. It doesn't take half an eye to catch the expressions of interest and surprise as the student realizes for the first time that geography has been a potent and inexorable factor in shaping his destiny; that there is a definite and fixed relation between the geographical conditions of a region and the progress, intellectuality, and influence of the inhabitants.

Since the aim of all education is the development of character and since the period in the child's life between the Seventh or Eighth Grade and High School graduation is the transition period from external direction and control to independent action and thinking, it behooves the geography teacher to consider carefully how his work may direct or influence this independence into right and profitable channels.

We wish to train the boys and girls into broad-minded, honest, sympathetic, clear-thinking men and women, able to see clearly and to meet face to face the problems of national and private life; to understand the conditions that have resulted in these problems and to go about their solution in a sane, unprejudiced manner. Can geography play any part in this training? We are inclined to believe that if rightly handled, it will supply by far the lion's share in developing good citizens of the United States.

In the report on Secondary School Geography, we find this statement: "A concrete study of human response to its environment does not receive sufficient attention. * * * A careful examination of our texts will show that the facts and principles stated are given scant application to concrete areas." This objection is in a sense removed by the study of topographic maps, by which close and careful study is given to concrete areas. But here, as elsewhere, the study is from a physiographic and geological standpoint and not from the standpoint of ontography. For instance,

in the use of a set of maps illustrating the work of running water—the Charleston, W. Va. sheet—the questions deal almost exclusively with the age of erosion, the amount of material removed, evidences of cycles of erosion, the possible development of Standing Stone, etc. Every one of them is interesting and instructive, and calls for clear thinking and accurate judging, but they touch only one phase of the great subject of geography. Might it not be well to supplement them with questions concerning the transportation facilities of such a region, the occupations that are possible, the inevitable lack of education and culture, and the grinding poverty always found under such circumstances? Is it not just as important and fully as helpful to the making of good, intelligent voters that the pupil realize the influence of this environment upon the inhabitants, as that he be able to tell you glibly that there have been two, three, or four successive uplifts in this territory? It has been my experience that the boys and girls are far more interested in the human side than in the physical side and that they leave the subject with a warmer sympathy and a broader tolerance for the ignorant feud-fighting mountaineer of Kentucky or the moonshiner of West Virginia and the Carolinas.

Quoting from the Report again, "Secondary School Geography does not give the student a grasp of the natural resources, the industries, and the commerce of the world." Among about 150 High School graduates who have been in my classes during the past year and a half, I have found about ten, perhaps twenty, students who had a clear cut idea of what the term "natural resources" really means. Such statements as this are common: "The natural resources of the St. Lawrence Basin are fishing, agriculture, and manufacturing." When I give in an examination such a question as this: "Show how the geographic conditions of a region affect the industries and development of the inhabitants," about three in ten of the students hit the target at all, and perhaps one in ten hits the bull's eye. The one who goes at the problem in an intelligent way is nearly always a man with one or two years of experience in teaching or business since he left the High School. One of the live present day problems before the American people is the conservation of our natural resources. This problem will not be settled in a year nor a decade, and I

believe that it is more important that the pupil know something about this great question and be able to discuss it intelligently than that he know definitely and clearly that the three great forces at work changing the surface of the earth are gradation, vulcanism, and diastrophism. Let us attack the problem from another standpoint. One year out of High School finds the pupil with hazy, indefinite ideas of the principles of physiography. Not because he was poorly taught, for in the majority of cases he has been well taught, but because the subjects which he discussed in the classroom are discussed no place else. He never sees them mentioned in the current periodicals nor hears them spoken of among his elders either at home or abroad. In other words, most of our geography teaching is not concerned with the living present. I wonder if the boys would not remember and appreciate more about the migration of the heat equator and its attendant weather if it were studied in connection with the Panama Canal Zone or Cuba. Perhaps they would be more interested in the variations in the length of day and night and the causes thereof if they were introduced to the subject through the study of Alaska. All of these places are regions now before the public eye, and are likely to be for some time to come. Yet they are not taught to the majority of children either in the High Schools or in the grades. First, because the bulk of teaching is done by teachers with but very little experience, and the unseasoned teacher will teach not what he should teach nor as it should be taught, but he will teach what was taught to him and will follow as closely as he can the methods of his own instructor, be they fitted for seminar courses or Summer School University classes, regardless of the needs of the pupils under him. People, especially young teachers, with an appreciable amount of originality are seldom met with. To be sure, the teachers in cities and large towns are not untrained nor lacking in experience, but the bulk of our children does not attend that kind of school. The young, inexperienced High School or University graduate, who has studied only physical geography in the High School and physiography or geology in the University, goes into the grades or back into the High School as teacher. He has had no training in regional geography, he knows nothing about its compelling interest and broad cultural effects, and if

his work is in the grades, he teaches only what is found in the meagre text-book as it was taught to him in his youth and perchance attempts to supplement this with a few abstract facts in physical geography admirably suited to a senior class in the University, never realizing that the great mass of humanity is interested in people and what concerns them and cares not at all whether the débris on the surface of a glacier got there by rolling from the mountain sides or by the upturning of the layers of ice.

The Committee recommends that about one-half year be devoted to physical geography and the remainder to a study of North America and Europe. I should like to suggest two changes in this proposition. First, I should add to the study of North America and Europe, an investigation of one of the oriental countries, preferably Japan or China. Second, I should spend all of the year on this regional work except the last ten weeks which should be devoted to purely physical geography. I should lay the foundation for physical geography and arouse an interest in it and a desire for it during the study of the various regions referred to above.

As each physiographic region in North America is taken up, the phase of physical geography most strikingly represented in that region may be studied. For instance, the treatment of the St. Lawrence Basin may include a detailed study of lakes and waterfalls; that of the Atlantic Coastal Plain, a building coast with its attendant features, sand bars, barrier beaches, sand dunes, spits, hooks, estuaries, etc.; that of the Northern Piedmont may introduce a wearing coastline; the Appalachian Mountain System offers illustration for the study of mountain formation, river piracy, the effects of inequalities in hardness of underlying material; the Alleghany Plateau illustrates a region in the mature stage of erosion, or mountains due to circumdenudation; the Upper Mississippi Basin is an excellent field for illustrating the effects of continental glaciation; the Lower Mississippi Basin for river deposition and old age erosion; the Cordilleran Mountain System illustrates almost every phase of physical geography; the Aleutian Islands for explosive volcanoes, Columbia Plateau for lava flows, San Francisco and the Basin Ranges for diastrophism, the Colorado Plateau for river erosion and wind work, the Great Basin and the heavy coast rains lead to the study of

climatic conditions. If these phases are studied in connection with the soils, climate, natural resources, commercial relations, and the general development of the region, it will require no effort to join the human side and the physical side. Each will appear naturally in its relation to the other. Then when the class attacks the big subject of physiography, they bring to it enough of knowledge to give it a vital interest and the study will possess much meaning which it now lacks. Ten weeks will be sufficient to bring together and organize the material the student already is master of, because he will have at hand numerous associations for attaching the principles and laws he now learns, and the vigorous applications to concrete areas which he has already studied lead him to see that physical geography is not an abstract subject but is closely allied to the existing conditions and their control over human life.

Now my reasons for adding an oriental country, preferably Japan or China, to list of regions to be studied. First, Because these countries are the future market for our surplus grains, cotton, and manufactured steel articles. After the opening of the Panama Canal, our relations with these people will be more closely allied than they are now and will demand a knowledge of them sufficient to insure intelligent management of business and national affairs. At the present time, our relations are close enough to demand at least a speaking acquaintance with affairs as they really exist.

Second, Because these countries represent a civilization that has grown up under conditions in striking contrast to our own and European civilization. They have much to teach us as well as to learn from us, and if the student is made familiar with the virtues and strength of these peoples and is led to compare them with our own people he may be cured of the bigoted idea that whatever we do or have is without question all right and the best ever and that whatever the oriental does or has is perforce all wrong. Sensing our faults and weaknesses is the first step in overcoming them.

Third, These people, also those of any country, who are likely to come to us as immigrants should be carefully and painstakingly studied to give us power and intelligence in handling the immigrant problem.

Fourth, This study is the only rational and sane way to reduce race prejudice. Dr. Steiner, of Cornell College, Iowa, an authority on the immigrant problem, says that after he comes to know men thoroughly he finds but little difference whether they hail from North Germany or Southern India. The sun has burned one a little darker than the other, perhaps the hammer of environment has made one a trifle more energetic and shrewd, but beneath all this, each is swayed by the same emotions, responds to the same appeals, works from the same motives, is in fact "a man for a' that," entitled to respect and consideration and sympathetic helpfulness.

THE SUGAR CANE BELT IN THE UNITED STATES.—Our Southern coastal states represent the northern limit of the productive cane belt in the new world. Cane is a native of the tropics, and though it has a wide geographic range north and south of the equator, its requirements are so imperative and specific as to delimit the area of profitable cultivation. The following may be enumerated as the more essential requisites: a seven to nine months' growing season of warm days and prevailingly warm nights; a rainfall or irrigation supply amounting to tmrty to fifty inches during the growing season; and a comparatively dry autumn for the maturing stage and the harvesting season. These conditions are usually supplied by eastern South Carolina, eastern and southern Georgia, Florida, Louisiana, southern Alabama, and southern and eastern Texas. It is estimated by the Louisiana Experimental Station that Louisiana contains at least 10,000,000 acres adapted to the profitable cultivation of cane. The crop thrives best on fertile alluvial loams which contain large quantities of decayed vegetable matter. These soils are also very productive of rice, cotton, and vegetables, and the profits from these products are increasing each year. The cultivation of cane on a commercial scale for the manufacture of sugar is confined to Louisiana and Texas, although small quantities of cane sugar are manufactured in Florida, Georgia, and South Carolina.—*The Annals of the American Academy of Political and Social Science*, January, 1910.

"IMPROMPTU" LANTERN SLIDES

By H. D. Grose

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THE instructor in physiography and geology has frequent recourse to the use of diagrams in the presentation of his courses. The majority of these diagrams are relatively simple, and may be readily developed upon the blackboard before the class during the progress of the lecture. Indeed, in many instances it is just this feature which gives to the diagram its chief value. There are many other drawings, however, which do not require this developmental presentation, and which can be more advantageously prepared beforehand and presented in their completed form. For such figures there is often need of frequent use, in which case their repeated preparation for each occasion involves the expenditure of much valuable time that might otherwise be more profitably employed. The drawing of such diagrams upon sections of stout manilla paper or other suitable material, which can be exhibited when occasion demands, will be found an economy of time and effort. Charts of this kind, however, unless backed with cloth, are soon crumpled or torn; and in any case rapidly become soiled and unpresentable.

Those who have the advantages of the stereopticon can, of course, have lantern slides prepared from such sketches, and so obviate these difficulties. Occasion sometimes arises for a slide of this character on such short notice that it cannot be prepared in the ordinary manner. In that case, if the drawing to be reproduced is not too intricate, the slide may often be provided without recourse to the usual long and somewhat expensive photographic processes.

The apparatus necessary for the preparation of the "impromptu" slide consists of a bottle of good black ink, a pen with a very fine point, a few sheets of clear gelatine, lantern slide cover-glasses, and binding strips. A steady hand is a valuable adjunct. The gelatine, cover-glasses, and binding strips are to be obtained from the larger dealers in photographic supplies.

The diagram to be reproduced upon the slide should be sharply

outlined upon a sheet of paper, and should be drawn to such a scale that it may be contained in a square three inches in diameter. A sheet of the clear gelatine, cut to lantern slide size, three and a quarter by four inches, is centered upon the diagram, which is then traced upon the gelatine in ink with the fine pen. A little practice will insure uniform lines and a neat slide. The sheet of gelatine bearing its tracing is placed between two carefully cleaned cover-glasses, which are then bound together by means of a binding strip gummed about their edges. The addition of the thumb-mark and filing label completes the slide. If desired, a suitable title or other legend may be printed upon the gelatine before mounting.

If the sheets of gelatine are unavailable, fairly good results may be obtained by tracing the diagram directly upon a plain cover-glass. If this method is employed, great care must be taken to insure a thoroughly clean working surface, free especially from grease and finger-marks, which prevent the smooth flow of the ink. Washing the plates in alcohol, benzine, or gasolene, and drying with a clean soft cloth will usually secure the desired result. To those who are in the habit of making their own lantern slides by the photographic processes, a still better substitute for the gelatine sheets will suggest itself in the form of lantern-slide plates which have been cleared in the fixing bath and washed and dried in the usual manner. Upon the coated side of a plate thus prepared the required design may be traced; the addition of cover-glass and labels completes the slide.

Those who do not make their own photographic slides may secure the necessary plates and fixing chemicals from dealers in photographic goods. If the specially prepared fixing salts are purchased, full directions for their use will be found accompanying each package. In the absence of the ready-prepared salts, four ounces of sodium hyposulphite dissolved in six ounces of water will yield an efficient fixing bath. It is only necessary to place the plates in this solution until all traces of color have disappeared from their surface; they should then be washed in running water for half an hour, after which they are to be dried by being set on edge in a warm but not hot, dry place, preferably where a current of air may play upon them. When thoroughly dry, the plates are ready for use.

The lantern-slide worker or amateur photographer occasionally has dry plates which are spoiled or which, having outlived their usefulness, are no longer desired. Such material, usually consigned to the waste-box, may often be utilized in the preparation of traced slides. Select the thinnest of such discarded plates whose glass is free from flaws. These are to be trimmed to lantern-slide size by means of a glass-cutter. Of the trimmed sections, those whose gelatine surface is soiled or scratched should be converted into cover-glasses by soaking them in diluted hydrochloric acid or a hot saturated solution of washing-soda. The gelatine film may then be stripped off, leaving the clear glass behind. The remaining trimmed sections, whose film is free from scratches, may be cleared of their image by immersion for a time in a strong reducing bath. The formula for this bath is to be found in any booklet on photography, but the following modification is especially well adapted to the present purpose:

Water	10 oz.
Red Prussiate of Potash.....	30 grains.
Sodium Hyposulphite	120 grains.

The chemicals should be mixed just previous to their use. When all traces of the image have disappeared, the plates should be thoroughly washed in running water for not less than half an hour; after drying they are ready to receive the drawings.

The use of pen and ink upon plates prepared in this way will often be found of the greatest convenience in providing slides for an emergency; and such slides, once made, may be kept on file for future reference, obviating repeated reconstruction of the desired figure. Numerous slides may be provided in this way which would otherwise have to go to the photographer for the making or else be omitted entirely because of their expense. The funds available for lantern-slide equipment may thus often be extended to advantage. The possibilities of slides of this kind, being limited only by the skill of the operator, present an attractive field for experiment.

REVIEW

THE TEACHING OF GEOGRAPHY. By William J. Sutherland, Principal of the State Normal School, Platteville, Wis.; published by Scott, Foresman & Co., Chicago, 1909. 295 pages.

Principal Sutherland's book is a real contribution to the pedagogy of geography. The author is a teacher of long experience, particularly in normal school work.

The book is divided into three parts:

(1) The nature and scope of geography, eight chapters;
(2) The teaching of geography, seven chapters;
(3) Practical suggestions, six chapters, with a final chapter on the Bibliography of Geography, giving some 40 titles of books dealing with the pedagogical side of the subject and 150 titles of reference books and textbooks.

A man who has reached the point of writing a book on the teaching of any subject is probably somewhat of an enthusiast in that subject. Being such, he is likely to attach much importance to the subject and to see much value in it. Usually he makes unreasonable claims for it, and leaves the impression that a large part of the pupil's time and most of the teacher's time ought to be devoted to it. On the whole, however, Principal Sutherland has made more reasonable claims for geography than specialists usually make. And that is to the credit of his book. His work in the field of general education has given him an educational philosophy which stands out boldly in Part I. His philosophy is that the aim of education is to enable man to adapt himself to his environment through knowledge of it, and to help him improve the environment when it is unfavorable. The author holds consistently to this main idea throughout his discussion of the nature and scope of geography. It is very clear, however, that in this discussion he is thinking mostly of geography for somewhat mature minds, rather than those phases of geography which must be given to young children. He says (p. 23): "But when these facts are learned independently of their antecedent causes and also independently of their consequent effects, one must realize that the fact side alone is uninteresting and insignificant."

This is acceptable when applied to mature geography and it has a degree of applicability to elementary school geography. But, quoting Mill, "A broad distinction should be drawn between the method of school teaching and of university teaching in geography. The former, in my opinion, should deal mainly with facts, the latter with relations and causes." It will be noted that Mill says "*mainly* with facts," not wholly.

Assuming that the author makes this distinction between *elementary* school geography and *advanced* geography (though not necessarily *university* geography), I am prepared to say that I regard Part I of his book as sound, sensible, helpful, besides being clear and forceful in presentation. His practice of stating a general principle and following it with a concrete example is excellent. His illustration "a case of geographic influence in Illinois"—is one of his best, because it is specific. His New England illustration is not so good, for it generalizes a little too broadly, which is, by the way, a tendency in the new geography. His adherence to the rather unfortunate term "geographic *controls*" for geographic *influences* is to be regretted, for his definition (p. 35) indicates that he uses control in the sense of influence: A control is an element that exerts a marked influence upon the development of a life form." It is to be hoped that, in geographical parlance, control will give place to the more accurate word influence.

The use of the term "social phase of geography" in the sense of "human phase" seems like a defensible substitution. The author's frequent reference to the need of broad scholarship, his figure on Page 57 showing that geography includes quite a liberal slice from each of eight natural and physical sciences, his belief that the good teacher of geography "must certainly take into consideration physiographic, economic, social and political conditions" (p. 91) and that she "must have a clear outline of the earth's history and understand the great physiographic processes that have wrought through the ages" (p. 24); that "Teachers of the subject must comprehend the importance of treating the subject scientifically," and that "The very nature of the subject demands a broad sweep of knowledge on the part of the teacher and the chief source of failure in geography instruction is due to lack of breadth in general scholarship,"—all tend to show

that he has in mind a type of person who can not be found or expected in the ordinary graded school, where the teacher must be as efficient in a half dozen other subjects as she is in geography. Principal Sutherland is too experienced in making teachers to expect to find many such specialists teaching in the grades, either to-day or to-morrow.

There is scarcely more than a mention of that extremely essential phase of elementary work, namely, place geography or knowledge of location. The new geographies, for a time, made the mistake of discrediting this phase of work in the elementary school. There is now a distinct reaction in favor of more emphasis on place geography in the grades. If Principal Sutherland designed his book for the ordinary grade teacher as well as for the specialist, we cannot help wishing he had given a chapter to the need of drill in the location, or place, phase of geography.

Parts II and III deal largely with methods and devices. Like other parts of the book, they reflect the sensible and experienced school man.

The teacher who is seeking specific suggestions rather than discussion of general principles, will find help in the chapters on Inductive and Deductive Method, on Organization of Materials, and on the use of text-books, magazines, pictures and museum materials.

The bibliography contains the titles of most of the readily available and desirable books for the teacher's use, as well as those of a considerable number of shorter papers. Perhaps a more limited and more discriminating selection, with brief comments, would have been more directly helpful to teachers.

All told, the book is a meritorious one. It ought to find a welcome in normal and training classes, in the reference library and on the teacher's book shelf.

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RECENT PUBLICATIONS

ELEMENTS OF TRANSPORTATION. By Emory R. Johnson; pp. xvii+360. D. Appleton & Company, 1909.

A volume dealing with steam railway transportation, electric railway transportation, ocean transportation and inland waterways. A valuable book for all who would understand the elements of transportation.

MANUAL OF PHYSICAL GEOGRAPHY. By Frederick V. Emerson; pp. xvii+290. The Macmillan Company, 1909.

The most inclusive manual that has thus far appeared. To be reviewed later.

THE BRITISH ISLES. Selected by Lettice Jowett; pp. xix+280. A. & C. Black, 1909.

The latest addition to the series of Descriptive Geographies edited by Dr. A. J. Herbertson is devoted to the British Isles. Besides the selections from standard authorities, which have been well chosen, the volume includes a brief introductory summary of the geography of the British Isles and a valuable bibliography. An excellent volume for reference work in the upper grades.

THE PRACTICAL GEOGRAPHY, Part II. By J. F. Unstead; pp. 112. The Clarendon Press, Oxford, 1909.

A series of practical, graphic and map exercises dealing with map making, weather, the world as a globe, the principal countries of the world, and comparative development of Britain and other countries. Many of the exercises deal with commercial and industrial facts. Very suggestive.

THE ELEMENTARY GEOGRAPHY. By F. D. Herbertson; Vol. I, A First Physiography; Vol. II, In and About Our Islands. Clarendon Press, Oxford, 1909.

Two volumes for beginners, whose scope is indicated by the titles. Somewhat different in plan from most American books for beginners, and too condensed in treatment to be used as texts for study.

NOTES

GEOGRAPHY IN ELEMENTARY SCHOOLS.—A recent report of Superintendent Elson of Cleveland, Ohio, includes comparative statistics of the time devoted to the several elementary school subjects in 1908 in ten of the largest cities of the country. According to this report, geography and history *together* occupy the per cents of the total elementary school course indicated below:

Boston	10.06
New York	10.77
Chicago	9.65
Rochester	16.95
Cincinnati	13.28
Indianapolis	9.66
St. Louis	11.50
Milwaukee	9.55
Kansas City	14.10
San Francisco	12.82
Average	11.83

In comparison it should be noted that the average for arithmetic in these same cities is 15.15 as against an average of 11.83 for geography and history combined.

IMPORTS AND EXPORTS OF THE UNITED STATES IN 1908.—The imports of merchandise into the United States for the fiscal year ending July 1, 1908, amounted to $1,194,341,792 or an equivalent of $13.57 per capita; the exports for the same period equalled $1, 860,773,346, amounting to $21.04 per capita. Manufactures ready for consumption formed more than 26 per cent. of the exports of the United States for the year ending July 1, 1908.

CONSUMPTION OF SUGAR, COFFEE AND TEA IN THE UNITED STATES.—The consumption of sugar per capita in the United States in 1908 is estimated at over seventy-five pounds, that of coffee more than ten pounds, and of tea more than one pound.

RAILROADS IN THE UNITED STATES.—The United States in 1908 had 230,297 miles of railway; the second country in length of mileage was Russia with a total of 44,025 miles.

GEOGRAPHICAL LANTERN SLIDES.—Professor D. W. Johnson of Harvard University has prepared a series of forty lantern slides designed especially for use by teachers of physical geography. Each slide reproduces a photograph and a contour map of the same topographic feature, the map being so oriented that its bottom is the foreground of the photograph.

The slides are manufactured under the direction of Professor W. H. Lawrence, Massachusetts Institute of Technology, Boston, from whom the descriptive catalogue can be secured (without cost) upon application.

To the Editor, The Journal of Geography:

SIR.—The article in the issue for November last dealing with *The Teaching of Geography* asks teachers of Geography to consider two questions: perhaps the views of an English teacher may interest your readers.

The writer complains that the facts of Geography are not known so accurately as they used to be known; may it not be that his tests were not of the right kind? Surely the great point is not whether the pupil knows for example "Where and what San Juan is," but whether the pupil knows how to find out where and what X is? (X being any name relating to Geography.) For purposes such as this the training provided by the usual text-book is inadequate, and hence the tendency to do without such books.

School geography is a scientific subject, and should be treated by the methods adopted for science teaching, the methods of observation and inference. The subject matter of the science consists in the facts relative to man's life on the earth; and these facts can only be presented to the pupil (i) (to a limited degree) for his own first-hand observation, and (ii) for his observation of the records of the first-hand observations of others.

It follows from this that part of the school course in geography must be devoted to the interpretation of records of the observations of others, and this can only be done by letting the pupil attempt to record his own experience by the methods usually adopted. This justifies that part of school work which includes measurement, map-making, the reading of contour maps,

the making of climatic maps with isotherms, isobars, etc., the making of climatic diagrams, etc.; and in all this work the pupil is forced to attend to his own experience, and to form for himself standards of comparison with which he may compare the records of other observers.

As soon as the pupil has learned how records are made in one of the established ways, he proceeds to observe similar records made by others and thus begins the stage of inference.

Consequently, the pupil should (i) observe reality and record facts for himself; (ii) observe the records of others and make inferences for himself therefrom: and the end of his course should leave him in such a position that he can make a record of the geography of any region for himself, in other words can write a text-book of the old-fashioned kind for himself. Thus the teacher has to provide in due order the records to be observed; and this justifies the use of three kinds of material: 1. Maps of all kinds. 2. The official publications of the various countries 3. First-hand records by camera or in words of life elsewhere.

Hence the modern text-book should (i) deal with methods of making records; (ii) contain the records of the facts from official and first-hand sources. Such a text-book would depart from the traditional type to so great an extent, that for the present it is possible that a modification of this ideal type would be more acceptable. Such a modification would provide the material for inference, and would indicate the main lines on which the inference is to be made. Since the main aim of teaching lies in the fact that the pupils must *know how* to do things rather than must know facts, such a modified text would require a supplement dealing with sources of informations and would inevitably lead to the use of the official publications. For school purposes an extensive library of material for the pupil's use is more important than a text.

Faithfully yours,

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